

NON-PUBLIC?: N
ACCESSION #: 8811300318
LICENSEE EVENT REPORT (LER)

FACILITY NAME: RIVER BEND STATION PAGE: 1 OF 4

DOCKET NUMBER: 05000458

TITLE: Grounding Transformer Fault Causing Generator Trip with Reactor Scram
and High Pressure Core Spray and Reactor Core Isolation Cooling System
Injections

EVENT DATE: 09/06/88 LER #: 88-021-01 REPORT DATE: 10/05/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: L.A. England

Director - Nuclear Licensing TELEPHONE: 504-381-4145

COMPONENT FAILURE DESCRIPTION:

CAUSE: C SYSTEM: EA COMPONENT: XFMR MANUFACTURER: G080
REPORTABLE TO NPRDS: YES

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On 9/6/88 at 0606 hours, with the unit in operational condition 1 at 100 percent power, the generator/turbine tripped resulting in a reactor scram. The generator tripped due to a fault on the neutral grounding transformer for 1STX-XGN1A (normal 13.8 KV station service transformer). The fault was caused by a stray cat shorting out the high side (13.8KV) of the grounding transformer.

The high pressure core spray (HPCS) system and reactor core isolation cooling (RCIC) system were inadvertently initiated on spurious level 2 differential pressure signals. A notice of unusual event was declared at 0713 hours based on emergency core cooling system injection into the reactor vessel.

Gulf States Utilities Company (GSU) is investigating methods of protecting the exposed transformer terminations from stray animals and modifications to the HPCS and RCIC systems low reactor water level circuits to prevent spurious actuations from similar pressure transients.

There was no impact on the safe operation of the plant or to the health and safety of the public as a result of this event. The reactor scram placed the unit in the safe shutdown condition.

END OF ABSTRACT

TEXT PAGE 2 OF 4

REPORTED CONDITION

On 9/6/88 at 0606 hours with the unit in operational condition 1 at 100 percent power, a reactor (*RCT*) scram occurred as a result of a turbine/main generator (*TB*) trip. The generator trip was the result of a fault on the neutral grounding transformer (*XFMR*) for the 13.8KV normal station service transformer (1STX-XNS1A). A stray cat caused the fault when it came in contact with the high side of the grounding transformer. The high current flow condition was sensed by the transformer differential relaying which caused the generator trip and subsequent turbine control transformer valve fast closure and reactor scram.

Additionally, an inadvertent initiation of the high pressure core spray (HPCS) (*BG*) and reactor core isolation cooling systems (RCIC) (*BN*) occurred due to a spurious low reactor water level differential pressure signal. Rosemount type 1154 transmitters (*LT*) B21N073C, G, L, and R and B21N091 A, B, E, and F indicated low level spikes on the wide range water level instrumentation. Other narrow range level instrumentation indicated that a low reactor level was never reached. A Notification of Unusual Event (NOUE) was initiated due to the Emergency Core Cooling System (ECCS) injection into the reactor vessel.

INVESTIGATION

The transformer fault was a result of a stray cat shorting out the high side of the grounding transformer. This condition was detected by the 1STX-XNS1A differential relays (*87*) 87S1-A, B & C phases. These relays tripped the main generator 86 lockout relays which tripped the generator, normal station service transformer breakers (*BKR*), and the main turbine (*TA*). All target indications were normal for the fault that occurred. Target indication on 85BU and 85P indicated a pilot wire transfer trip operation to the Fancy Point Substation. Operations indicated that the 13.8KV and 4.16KV bus (*BU*) fast transfer schemes operated properly.

A 47.8 second HPCS injection and a 42 second RCIC injection occurred during the scram. Using the Sequence of Events Report (SER) from the process computer (*CPU*), it was determined that a HPCS wide range low water level 2 (-43 inches) signal was received on channels G, L, and R for 11, 36, and 45 milliseconds respectively. In addition, a RCIC initiation occurred at the same time. The instruments used to measure reactor water level for this logic are Rosemount

type 1154 transmitters B21N073C, G, L, and R for HPCS and B21N091A, B, E, and F for RCIC, residual heat removal (RHR) (*BO*), low pressure core spray (LPCS) (*BM*), and the automatic depressurization system (ADS). These are fast acting transmitters with no electronic signal dampening. Using the emergency response information system (ERIS) data, the B21N073C and L and B21N091A and B showed significant spikes 300

TEXT PAGE 3 OF 4

milliseconds after the scram. ERIS monitors these points in 100 millisecond intervals and showed magnitudes of -23, -43, -27, and +4 inches. The monitoring interval duration is too long for the lowest peak magnitudes to be captured by ERIS. However, due to the initiations observed, it is apparent that at least the correct two out of four trip units for both HPCS and RCIC received a spurious level 2 signal of sufficient duration to seal in the initiation logic. These instruments are tapped off of each of the four reference condensing pots and are connected to 3 different power sources.

A true low reactor water level was not reached as evidenced by the following narrow range water level (Rosemount 1152) transmitter signals which do contain signal dampening capabilities:

- 1) B21N080A, B, C, D which have reactor protection system (RPS) (*JC*) level 3 scram signals associated with them. The level 3 scram signals did not occur until 2 seconds after the HPCS/RCIC start/resets as shown on process computer SER (this level 3 is consistent with analog data from C33N004A, B, and C ERIS plots);
- 2) B21N081A, B, C, and D which have nuclear steam supply shutoff system (NSSSS) level 2 initiation signals for balance-of-plant (BOP) equipment and reactor water cleanup (RWCU) (*CE*) isolations. These isolations did not occur as evidenced by process computer SER and plant response;
- 3) B21N099A, B, E, and F which have anticipated transient without scram (ATWS) level 2 trips associated with them. These trips did not occur as evidenced by plant response;
- 4) C33N004A, B, and C are monitored by ERIS and showed no spiking.

The above transmitters (items 1-4) are all Rosemount type 1152 instruments which have built-in electronic dampening which slows the response of these instruments. These instruments are also tapped off of each of the four reference condensing pots and are connected to 5 different power sources.

The above data indicates that the 11 to 45 millisecond level spikes were caused

by the 100 percent turbine trip and turbine control valve fast closure induced pressure transient in the reactor steam dome. This pressure transient was immediately transmitted to the four reactor level reference legs located near the top of the reactor but were not immediately sensed by the eight narrow and wide range variable leg taps located lower in the reactor vessel. Since the wide range level transmitters were of the 1154 fast acting type (without signal dampening), the pressure transient was detected and a differential pressure signal received. This analysis is substantiated

TEXT PAGE 4 OF 4

by similar events resulting from a scram that occurred on 8/25/88 (see River Bend Station LER 88-018).

A review of previously submitted LERs from River Bend Station revealed no other events were reported with a similar root cause.

CORRECTIVE ACTION

The normal station service transformer (1STX-XNS1A) was isolated to facilitate plant start-up while the replacement of the grounding transformer and associated damage to conductors and bus duct proceeds. Engineering is currently investigating the protection of exposed transformer terminations from stray animals and modifications to the HPCS and RCIC low reactor water level circuits to prevent subsequent spurious initiations.

SAFETY ASSESSMENT

There was no impact on the safe operation of the plant or to the health and safety of the public as a result of this event since the reactor scram placed the unit in the safe shutdown condition and all systems functioned as designed.

Note: Energy Industry Identification System Codes are identified in the text as (*XX*).

ATTACHMENT 1 TO 8811300318 PAGE 1 OF 1

GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST.FRANCISVILLE,LOUISIANA
70775

November 23, 1988

RBG- 29383

File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1

Docket No. 50-458

Please find enclosed Licensee Event Report (LER) No. 88-021 Revision 1 for River Bend Station - Unit 1. This supplemental report is being submitted pursuant to 10CFR50.73 and to identify a NPRDS reportable equipment failure not demonstrated in the initial LER.

Sincerely,

J. E. Booker
Manager-River Bend Oversight
River Bend Nuclear Group

JEB/TFP/PDG/JHM/ch

cc: U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

NRC Resident Inspector
P.O. Box 1051
St. Francisville, LA 70775

INPO Records Center
1100 Circle 75 Parkway
Atlanta, GA 30339-3064

*** END OF DOCUMENT ***
